

Science and Education for Working Lands¹ and Ecosystems

The goal of the Environment and Natural Resources (ENR) Enterprise is to support research, education, and extension programs that optimize the production of agricultural goods and services while protecting the environment.

Agricultural working lands are highly connected human-natural systems. Due to complex relationships and feedback among people, ecosystems, and the physical environment, human well-being is inextricably linked to the optimal use and management of the agroecosystems that make up working lands. Relative to space, composition, and functionality, the agricultural, natural, and human components are so highly interdependent that the system of systems has to be studied and managed as an integrated whole. As a result, ecology, socioeconomics, and culture cannot be separated from agricultural production, farming communities, and environmental health. Viewing working lands as part of an ecological system and a human-dominated, socioeconomic production system yields a broad range of performance criteria, including ecological goods and services, sustainability, resource conservation, food security, economic viability, social equity, and quality of life. Fundamental questions in coupled human-natural systems consider feedback, human design and engineering of ecological processes and whole ecosystems, emergent behavior, and the dynamics of interacting agricultural, natural and socioeconomic systems.

Working lands face many opportunities and challenges in the 21st century. Current demographic and economic forces are changing how working lands are managed. In a world that is more populated, urbanized, and highly interconnected, a more integrated understanding of the complex interactions among human societies, ecosystems of working lands, and natural areas is needed. Improved knowledge of how behavior, decisions, and choices affect natural resources at the local, regional, national and global scale can identify vulnerabilities and options that enhance agricultural sustainability and provide a basis for the necessary structures (legislation, administration, financing) for change. Efforts to seize these opportunities and surmount the challenges of the “new rural economy” will require new partnerships among a wide range of institutions and stakeholders. Building partnerships both within and outside the land grant system and becoming more engaged with national and international communities, government agencies, and society at large are critical to addressing the complex issues involved with managing working lands.

Our educational system must develop a diverse workforce with the transdisciplinary knowledge, skills, and values required to solve complex problems in agroecosystems. Fresh and innovative approaches to education are needed to engage individuals equipping learners with skills to work on complex, interdisciplinary and cross-cultural teams. Public education and extension programs are needed to inform and educate a new generation of decision makers, landowners, and engaged citizens. The ENR goal (see above) involves transforming the ways that working lands are managed. Successful land stewardship, especially under climate change and changing land use scenarios such as biofuel production and urbanization, requires an understanding of the complex interrelationships among physical, ecological, and social drivers. The ENR strategy in achieving this goal is to use our understanding of coupled human-natural systems to enable people to be better informed in their personal and professional endeavors about working lands and ecosystems.

¹Working lands are defined as lands used to produce agricultural goods and services